© 2023. Published by The Company of Biologists Ltd | Journal of Experimental Biology (2023) 226, jeb246069. doi:10.1242/jeb.246069

ECR SPOTLIGHT

ECR Spotlight – V. David Munteanu

ECR Spotlight is a series of interviews with early-career authors from a selection of papers published in Journal of Experimental Biology and aims to promote not only the diversity of early-career researchers (ECRs) working in experimental biology during our centenary year, but also the huge variety of animals and physiological systems that are essential for the 'comparative' approach. V. David Munteanu is an author on 'Limb bone strains during climbing in green iguanas (*Iguana iguana*): testing biomechanical release as a mechanism promoting morphological transitions in arboreal vertebrates', published in JEB. David is a PhD student in the lab of Richard Blob at Department of Biological Sciences, Clemson University, USA, investigating the biomechanics of habitat transitions in vertebrates.

Describe your scientific journey and your current research focus

While attending Bucknell University as an undergrad, I studied the morphology and function of turtle shells with Dr Tristan Stayton. This was a formative experience, and helped cultivate my fascination with vertebrate morphology and biomechanics. I am currently working on my PhD with Dr Richard Blob at Clemson University. My current research focus is investigating the morphological and behavioral specializations associated with inhabiting high-risk environments, at both an organismal and macroevolutionary scale. Specifically, I am studying the biomechanical traits that have enabled a variety of lizard lineages to thrive in arboreal habitats.

How would you explain the main finding of your paper to a member of the public?

Bones can, over evolutionary time, come to exhibit different shapes depending on the types of forces that species consistently experience. When a species makes a transition to a different habitat, new physical features of that habitat may impose changes in the forces that it experiences. Many animals that live in trees or are adept at climbing can evolve longer limbs, which could potentially be useful for a longer reach in climbing situations. However, is it possible that these longer bones were able to evolve because the consistent strains and forces associated with terrestrial movements were 'alleviated' in arboreal (tree-based) habitats? To answer this question, we measured strain in the limb bones of green iguanas as they traversed a trackway that simulated different environmental features of both terrestrial and arboreal habitats. We found that trackway features associated with arboreal habitats, such as incline and compliance, actually elicited higher bone strains than level ground. Thus 'alleviation' of strain magnitudes is probably not a mechanism for that promoted limb bone elongation in species that invaded arboreal habitats.

V. David Munteanu's contact details: Department of Biological Sciences, Clemson University, Clemson, SC 29634, USA.
E-mail: munteanu.david@gmail.com

V. David Munteanu

What are the potential implications of this finding for your field of research, and is there anything that you learned during this study that you wish you had known sooner?

I think there is still much to learn about the factors that influence bone shape evolution, particularly in arboreal systems. There are so many strong selective pressures, and I feel that the work we reported in this study can provide paths for future studies, particularly within other systems. Though it seems obvious in retrospect, I did not realize before starting this study just how much of the ability to collect *in vivo* experimental data from animals is predicated on the animals' behavior. The entire procedure and setup can be immaculate, but the animal may be unwilling to cooperate, and that can limit the scope of your results for that day. Luckily for this publication, the animals were cooperative most of the time.

Which part of this research project was the most rewarding/challenging?

Being part of every step in the process and learning how to proceed was very rewarding. From conceptualization to physically working with the animals to collect data, to then analysing the data and composing a manuscript for publication…. Seeing the whole thing through helped to put a lot of impostor syndrome to rest.

Journal of Experimental Biology (2023) 226, jeb246069. doi:10.1242/jeb.246069

The author readying an iguana for data collection.

Are there any important historical papers from your field that have been published in JEB?

I believe that Young et al.'s 2017 paper 'Humeral loads during swimming and walking in turtles: implications for morphological change during aquatic reinvasions' (doi:10.1242/jeb.156836) is historic within my field. This paper details biomechanical release as a mechanism for changing bone morphology, and it laid the foundation for the concept of this just-published paper of mine.

If you had unlimited funding, what question in your research field would you most like to address?

I am fascinated by the changes in locomotor functional morphology as animal size becomes larger. How do large animals evolve to handle the different demands of gravity and inertia imposed on their bodies? Many studies have modeled or simulated these dynamics, but I wonder if there are any aberrations from the models. At the end of the day, studying the extra-large animals *in vivo* is expensive and sometimes dangerous.

What's next for you?

I am currently halfway through my PhD, and I intend to continue within academia. I am enthusiastic about my research, and conducting research often is so fun that it does not feel like work. Whether it is a post-doctoral fellowship or a faculty position, I look forward to what the future holds for me!

Reference

Munteanu, V. D., Diamond, K. M. and Blob, R. W. (2023). Limb bone strains during climbing in green iguanas (*Iguana iguana*): testing biomechanical release as a mechanism promoting morphological transitions in arboreal vertebrates. *J. Exp. Biol.* **226**, jeb245175. doi:10.1242/jeb.245175